

Appl. No. 10/708,242  
Amdt. dated December 4, 2006  
Reply to Office action of November 6, 2006

**Amendments to the Claims:**

I. (currently amended) A computer system comprising:

- a host entity for issuing IO requests;
- a redundant external storage virtualization controller (SVC) pair for performing IO  
5 operations in response to IO requests issued by the host entity comprising a first  
and a second external storage virtualization controller coupled to the host entity;  
and
- a set of at least one physical storage device for providing storage to the computer  
system, with at least one member of said set of at least one physical storage  
10 device comprising a PSD coupled to the said redundant storage virtualization  
controller pair through a point-to-point serial signal interconnect;
- wherein when one storage virtualization controller in the said redundant SVC pair is  
not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the  
15 functionality originally performed by the said one storage virtualization controller  
in the redundant SVC pair; and
- wherein in the redundant storage virtualization controller pair, each of the storage  
virtualization controllers further comprises:
  - a central processing circuitry for performing IO operations in response to IO  
20 requests of said host entity;
  - at least one IO device interconnect controller coupled to said central processing  
circuitry;
  - at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and
  - 25 at least one device-side IO device interconnect port provided in a said at least one IO  
device interconnect controller coupled to said at least one physical storage device  
through a point-to-point serial-signal interconnect.

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2. (original) The redundant storage virtualization computer system of claim 1 wherein said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

5 3-4. (cancelled)

5. (currently amended) The storage virtualization computer system of one of claims 1 and 2 ~~claim 4~~ wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in the same said IO device interconnect controller.

6. (currently amended) The storage virtualization computer system of one of claims 1 and 2 ~~claim 4~~ wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in different said IO device interconnect controllers.

7-10. (cancelled)

11. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and  
a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is

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not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair;

- 5        wherein for each of at least one of the said physical storage devices, the redundant storage virtualization subsystem further comprises an access control switch coupled between said physical storage device and the redundant storage virtualization controller pair for selectively switching the connection of the said physical storage device to the redundant SVC pair between the first and the  
10       second storage virtualization controller; and

~~The redundant storage virtualization subsystem of claim 10, wherein at least one said PSD together with said access control switch is installed in a canister removably attached to the redundant storage virtualization subsystem.~~

- 15       12. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and  
20       a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

- wherein when one storage virtualization controller in the said redundant SVC pair is  
25       not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair;

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5        wherein for each of at least one of the said physical storage devices, the redundant storage virtualization subsystem further comprises an access control switch coupled between said physical storage device and the redundant storage virtualization controller pair for selectively switching the connection of the said physical storage device to the redundant SVC pair between the first and the second storage virtualization controller; and

10        ~~The redundant storage virtualization subsystem of claim 10~~ wherein said access control switch coupled between a said physical storage device and the redundant storage virtualization controller pair selectively allows patching through of the serial signal of the said physical storage device to and from the first SVC when in a first patching state of said access control switch and to and from the second SVC when in a second patching state of said access control switch.

15        13. (currently amended) The redundant storage virtualization subsystem of one of claims claim 12 and 141, wherein an access ownership arbitration mechanism is provided between said SVC pair and said access control switch to control the patching state of said access control switch.

20        14. (original) The redundant storage virtualization subsystem of claim 13, wherein said access ownership arbitration mechanism comprises a pair of access request signal lines coupled between said SVC pair; said first SVC being active on a first of said access request signal line pair and passive on a second of said access request signal line pair; said second SVC being active on said second and passive on said first of said access request signal line pair; and said SVC pair each being  
25        capable of issuing an access request signal on its own said active access request signal line, and reading a requesting state on its own said passive access request signal line and identifying a change of said requesting state since previous reading on its own said passive access request signal line.

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- 5           15. (original) The redundant storage virtualization subsystem of claim 13, wherein  
              said access ownership arbitration mechanism includes an access ownership  
              detecting mechanism to determine if access ownership is possessed by a said  
              SVC.
- 10           16. (original) The redundant storage virtualization subsystem of claim 13, wherein  
              said access ownership arbitration mechanism includes an access ownership  
              granting mechanism to grant access ownership when said access ownership is  
              requested by a said SVC.
- 15           17. (original) The redundant storage virtualization subsystem of claim 13, wherein  
              said access ownership arbitration mechanism comprises an access ownership  
              arbitration circuit (AOAC) coupled to said first and second SVCs and said access  
              control switch, and wherein if said first SVC issues a first access ownership  
              request signal received by said AOAC, access ownership will be granted to said  
              first SVC when said second SVC does not already possess the access ownership,  
              and if said second SVC issues a second access ownership request signal received  
20           by said AOAC, access ownership will be granted to said second SVC when said  
              first SVC does not already possess the access ownership.
- 25           18. (original) The redundant storage virtualization subsystem of claim 17, further  
              comprises an access ownership determining mechanism whereby when said first  
              and said second SVC concurrently issue said first and second access ownership  
              request signals to said AOAC, access ownership will be granted to a  
              predetermined one of said SVC pair.
19. (currently amended) A redundant storage virtualization subsystem for providing

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- storage to a host entity, comprising:
- a redundant external storage virtualization controller (SVC) pair for performing IO  
operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and
- 5 a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
pair through a point-to-point serial signal interconnect;
- wherein when one storage virtualization controller in the said redundant SVC pair is  
10 not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the  
functionality originally performed by the said one storage virtualization controller  
in the redundant SVC pair;
- wherein for each of at least one of the said physical storage devices, the redundant  
15 storage virtualization subsystem further comprises an access control switch  
coupled between said physical storage device and the redundant storage  
virtualization controller pair for selectively switching the connection of the said  
physical storage device to the redundant SVC pair between the first and the  
second storage virtualization controller; and
- 20 ~~The redundant storage virtualization subsystem of claim 10,~~ further comprising a  
cooperating mechanism for the redundant SVC pair to cooperatively control a  
patching state of said access control switch; a monitoring mechanism for each  
SVC of said SVC pair to monitor status of the other SVC of said SVC pair; and, a  
state control mechanism for each SVC of said SVC pair to forcibly take complete  
25 control of said access control switch independent of the state the other SVC of  
said SVC pair.

20. (currently amended) A redundant storage virtualization subsystem for providing

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- storage to a host entity, comprising:
- a redundant external storage virtualization controller (SVC) pair for performing IO  
operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and
- 5 a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
pair through a point-to-point serial signal interconnect;
- wherein when one storage virtualization controller in the said redundant SVC pair is  
10 not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the functionality  
originally performed by the said one storage virtualization controller in the redundant  
SVC pair; and
- ~~The redundant storage virtualization subsystem of one of claims 7 and 8 wherein in~~  
15 ~~the redundant storage virtualization controller pair, each of the storage virtualization~~  
~~controllers further comprises:~~
- ~~a central processing circuitry for performing IO operations in response to IO~~  
~~requests of said host entity;~~
- ~~at least one IO device interconnect controller coupled to said central processing~~  
20 ~~circuitry;~~
- ~~at least one host-side IO device interconnect port provided in a said at least one IO~~  
~~device interconnect controller for coupling to said host entity; and~~
- ~~at least one device-side IO device interconnect port provided in a said at least one~~  
~~IO device interconnect controller coupled to at least one physical storage~~  
25 ~~device through a point-to-point serial-signal interconnect.~~

21. (currently amended) The redundant storage virtualization subsystem of one of  
claims claim 20 and 143 wherein a said host-side IO device interconnect port

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and a said device-side IO device interconnect port are provided in the same said IO device interconnect controller.

5           22. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 20 and 143 wherein a said host-side IO device interconnect port  
and a said device-side IO device interconnect port are provided in different said  
IO device interconnect controllers.

10           23. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 20 and 143, wherein a logical media unit that is presented to said  
host entity through a first said host-side IO device interconnect port is also  
redundantly presented through a second said host-side IO device interconnect  
port.

15           24. (original) The redundant storage virtualization subsystem of claim 23, wherein  
the first said host-side IO device interconnect port and the second said host-side  
IO device interconnect port are IO device interconnect ports of the same one SVC  
in the redundant SVC pair.

20           25. (original) The redundant storage virtualization subsystem of claim 23, wherein  
the first said host-side IO device interconnect port is an IO device interconnect  
port of one SVC in the redundant SVC pair and the second said host-side IO  
device interconnect port is an IO device interconnect port of the other SVC in the  
redundant SVC pair.

25           26. (original) The redundant storage virtualization subsystem of claim 23, wherein  
the first said host-side IO device interconnect port and the second said host-side  
IO device interconnect port are coupled to the same host-side IO device



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interconnect.

- 5 27. (original) The redundant storage virtualization subsystem of claim 26, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are coupled to the said same host-side IO device interconnect through a switch circuit.
- 10 28. (original) The redundant storage virtualization subsystem of claim 23, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are each coupled to a different host-side IO device interconnect.
- 15 29. (currently amended) The redundant storage virtualization subsystem of one of claims claim 20 and 143, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting point-to-point connectivity in target mode.
- 20 30. (currently amended) The redundant storage virtualization subsystem of one of claims claim 20 and 143, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting public loop connectivity in target mode.
- 25 31. (currently amended) The redundant storage virtualization subsystem of one of claims claim 20 and 143, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting private loop connectivity in target mode.
32. (currently amended) The redundant storage virtualization subsystem of one of

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claims ~~claim~~ 20 and 143, wherein at least one said host-side IO device interconnect port is parallel SCSI operating in target mode.

5 33. (currently amended) The redundant storage virtualization subsystem of one of ~~claims~~ ~~claim~~ 20 and 143, wherein at least one said host-side IO device interconnect port is ethernet supporting the iSCSI protocol operating in target mode.

10 34. (currently amended) The redundant storage virtualization subsystem of one of ~~claims~~ ~~claim~~ 20 and 143, wherein at least one said host-side IO device interconnect port is Serial-Attached SCSI (SAS) operating in target mode.

15 35. (currently amended) The redundant storage virtualization subsystem of one of ~~claims~~ ~~claim~~ 20 and 143, wherein at least one said host-side IO device interconnect port is Serial ATA operating in target mode.

36. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO  
20 operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and  
a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
25 pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is  
not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the

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functionality originally performed by the said one storage virtualization controller  
in the redundant SVC pair; and

~~The redundant storage virtualization subsystem of one of claims 7 and 8,~~ wherein an  
inter-controller communication channel is provided between the two SVCs in  
said redundant SVC pair for communicating state synchronization information.

5

10

37. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 36 and 144, wherein said inter-controller communication channel is  
an existing IO device interconnect, whereby inter-controller communication  
exchange is multiplexed with IO requests and associated data.

15

38. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 36 and 144, wherein said inter-controller communication channel is  
a dedicated channel the primary function thereof is to exchange said state  
synchronization information.

20

39. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 36 and 144, wherein said inter-controller communication channel is  
Fibre Channel.

25

40. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 36 and 144, wherein said inter-controller communication channel is  
Serial ATA.

41. (currently amended) The redundant storage virtualization subsystem of one of  
claims ~~claim~~ 36 and 144, wherein said inter-controller communication channel is  
Parallel SCSI.

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42. (currently amended) The redundant storage virtualization subsystem of one of claims claim 36 and 144, wherein said inter-controller communication channel is Ethernet.
- 5 43. (currently amended) The redundant storage virtualization subsystem of one of claims claim 36 and 144, wherein said inter-controller communication channel is Serial-Attached SCSI (SAS).
- 10 44. (currently amended) The redundant storage virtualization subsystem of one of claims claim 36 and 144, wherein said inter-controller communication channel is I2C.
45. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
15 a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device  
20 comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the  
25 functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and  
~~The redundant storage virtualization subsystem of one of claims 7 and 8, wherein~~  
said redundant SVC pair can perform IO request rerouting function.

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46. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO  
5 operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and  
a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
10 pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is  
not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the  
functionality originally performed by the said one storage virtualization controller  
15 in the redundant SVC pair; and  
~~The redundant storage virtualization subsystem of one of claims 7 and 8, wherein~~  
said redundant SVC pair can perform PSD access ownership transfer function.
47. (currently amended) A redundant storage virtualization subsystem for providing  
20 storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO  
operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and  
a set of at least one physical storage device for providing storage to the host entity,  
25 with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is

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not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

5     ~~The redundant storage virtualization subsystem of one of claims 7 and 8,~~ wherein at least one member SVC of said redundant SVC pair includes at least one expansion port for coupling to a second set of at least one PSD through a multiple-device device-side IO device interconnect.

10     48. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein members of a set of at least one said expansion port are mutually coupled together and to the said second set of at least one PSD through a switch circuit.

15     49. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein members of a set of at least one said expansion port are mutually coupled together and to the said second set of at least one PSD directly without intervening circuitry.

20     50. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein a set of at least two said expansion ports form a redundant expansion port set for mutually performing IO request rerouting function whereby IO requests normally delivered to a PSD through a first member port of said redundant expansion port set may be rerouted through a  
25     second member port of said redundant expansion port set.

51. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein a member of said second set of at least one

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PSD has a pair of redundant ports with a member port of said redundant port pair being coupled to a set of at least one said expansion port.

52. (original) The redundant storage virtualization subsystem of claim 51, wherein  
5 IO request rerouting function can be performed through said redundant ports of  
said member of said second set of at least one PSD whereby IO requests normally  
delivered to a PSD through a first member port of said redundant port pair may  
be rerouted to said PSD through a second member port of said redundant port  
pair.

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53. (original) The redundant storage virtualization subsystem of claim 52, wherein a  
set of at least two said expansion ports form a redundant expansion port set for  
mutually performing IO request rerouting function whereby IO requests normally  
delivered to a PSD through a first member port of said redundant expansion port  
set may be rerouted through a second member port of said redundant expansion  
15 port set.

54. (original) The redundant storage virtualization subsystem of claim 51, wherein  
each member port in the said PSD redundant port pair is coupled to a different set  
20 of at least one expansion port.

55. (original) The redundant storage virtualization subsystem of claim 51, wherein  
said member port of redundant PSD port pair and said set of at least one said  
expansion port are mutually coupled together through a switch circuit.

25

56. (original) The redundant storage virtualization subsystem of claim 55, wherein  
said set of at least one expansion port comprises a first and a second expansion  
port subset forming a pair of complementary subsets with at least one member

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expansion port per subset.

- 5 57. (original) The redundant storage virtualization subsystem of claim 56, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair and coupling of said second subset of the said complementary subset pair to a second member port of said PSD redundant port pair.
- 10 58. (original) The redundant storage virtualization subsystem of claim 56, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of both subsets of the said complementary subset pair to a first member port of said PSD redundant port pair.
- 15 59. (original) The redundant storage virtualization subsystem of claim 56, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair.
- 20 60. (original) The redundant storage virtualization subsystem of claim 56, wherein said switch circuit implements an interconnect signal line switching mechanism that supports all of the following arrangements:
- 25 (1) coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair and coupling of said second subset of the said complementary subset pair to a second member port of said PSD redundant port pair;
- (2) coupling of both subsets of the said complementary subset pair to said first member port of said PSD redundant port pair;



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- (3) coupling of both subsets of the said complementary subset pair to said second member port of said PSD redundant port pair;
- (4) coupling of said first subset of the said complementary subset pair to said first member port of said PSD redundant port pair;
- 5 (5) coupling of said second subset of the said complementary subset pair to said second member port of said PSD redundant port pair;
- (6) coupling of said second subset of the said complementary subset pair to said first member port of said PSD redundant port pair; and,
- 10 (7) coupling of said first subset of the said complementary subset pair to said second member port of said PSD redundant port pair.

61. (original) The redundant storage virtualization subsystem of claim 51, wherein said member port of redundant PSD port pair and said set of at least one said expansion port are directly coupled together without intervening circuitry.

15 62. (original) The redundant storage virtualization subsystem of claim 51, wherein a member SVC of the redundant SVC pair further comprises at least two said expansion ports forming a redundant expansion port set.

20 63. (original) The redundant storage virtualization subsystem of claim 62, wherein a first and a second member port in the said redundant expansion port set are each coupled to a different one of member ports in redundant PSD port pair of a member PSD of said second set of at least one PSD.

25 64. (original) The redundant storage virtualization subsystem of claim 62, wherein a first and a second member port in the said redundant expansion port set are both coupled to the same one of member ports in redundant PSD port pair of a member PSD of said second set of at least one PSD.

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5 65. (original) The redundant storage virtualization subsystem of claim 64, wherein said first and said second member port are directly connected to the same one of member ports in redundant PSD port pair of a member of said second set of at least one PSD without intervening circuitry.

10 66. (original) The redundant storage virtualization subsystem of claim 51 comprising:  
a first expansion port set comprising at least one said expansion port on the first SVC in the redundant SVC pair; ,  
a second expansion port set comprising at least one said expansion port on the second SVC in the redundant SVC pair;  
wherein said first expansion port set and said second expansion port set together form a redundant expansion port set pair.

15 67. (original) The redundant storage virtualization subsystem of claim 66 wherein said first expansion port set and said second expansion port set are each coupled to a different one of member ports in redundant PSD port pair of each PSD of said second set of at least one PSD.

20 68. (original) The redundant storage virtualization subsystem of claim 66, wherein said first expansion port set and said second expansion port set are both coupled to the same one of member ports in redundant PSD port pair of each PSD of said second set of at least one PSD.

25 69. (currently amended) The redundant storage virtualization subsystem of one of claims ~~claim~~ 47 and 147, wherein at least one said expansion port is Fibre Channel.

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- 5
70. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein at least one said expansion port is Parallel SCSI.
71. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein at least one said expansion port is Serial ATA.
- 10
72. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein at least one said expansion port is Ethernet.
73. (currently amended) The redundant storage virtualization subsystem of one of claims claim 47 and 147, wherein at least one said expansion port is Serial-Attached SCSI (SAS).
- 15
74. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and  
a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;  
20  
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller  
25

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in the redundant SVC pair; and

~~The redundant storage virtualization subsystem of one of claims 7 and 8, wherein~~  
said PSD is a SATA PSD.

5 75. (currently amended) A redundant storage virtualization subsystem for providing  
storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO  
operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and

10 a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device  
comprising a PSD coupled to the said redundant storage virtualization controller  
pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is  
15 not on line or goes off line after being on line, the alternate storage virtualization  
controller in the said redundant SVC pair will automatically take over the  
functionality originally performed by the said one storage virtualization controller  
in the redundant SVC pair; and

~~The redundant storage virtualization subsystem of one of claims 7 and 8, wherein~~  
20 said PSD is a PATA PSD.

76. (currently amended) A redundant storage virtualization subsystem for providing  
storage to a host entity, comprising:

25 a redundant external storage virtualization controller (SVC) pair for performing IO  
operations in response to IO requests issued by the host entity comprising a first  
and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host entity,  
with at least one member of said set of at least one physical storage device

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comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and  
5 The redundant storage virtualization subsystem of one of claims 7 and 8, wherein each SVC in said redundant SVC pair includes a state-defining circuit for forcing externally connected signal lines of alternate SVC in said redundant SVC pair to a predetermined state.  
10

77. (currently amended) A redundant storage virtualization subsystem for providing storage to a host entity, comprising:  
15 a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device  
20 comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;  
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the  
25 functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and  
~~The redundant storage virtualization subsystem of one of claims 7 and 8, wherein~~  
each SVC of said redundant SVC pair includes a self-killing circuit for forcing its

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own externally connected signal lines to a predetermined state.

78. (cancelled)

- 5 79. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
10 circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
15 transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
20 off line after being on line; and  
~~The storage virtualization controller of claim 78 wherein a said host-side IO device~~  
~~interconnect port and a said device-side IO device interconnect port are provided~~  
~~in the same said IO device interconnect controller.~~
- 25 80. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;

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at least one IO device interconnect controller coupled to said central processing circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
5 at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage  
10 virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and  
~~The storage virtualization controller of claim 78~~ wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are  
15 provided in different said IO device interconnect controllers.

81. (cancelled)

82. (currently amended) An external storage virtualization controller for use in a  
20 redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing circuitry;  
25 at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal

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transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81~~ further comprising a  
detection mechanism for detecting an off-line or failed state of said alternate  
storage virtualization controller.

83. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein said SVC  
includes a state-defining circuit for forcing externally connected signal lines of



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alternate SVC in said redundant SVC pair to a predetermined state.

84. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

5 a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

10 at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

15 wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and

20 The storage virtualization controller of one of claims 78 and 81, wherein said SVC includes a self-killing circuit for forcing its own externally connected signal lines to a predetermined state.

85. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

25 a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

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5        at least one host-side IO device interconnect port provided in a said at least one IO  
         device interconnect controller for coupling to said host entity; and  
         at least one device-side IO device interconnect port provided in a said at least one  
         IO device interconnect controller for performing point-to-point serial signal  
         transmission with at least one physical storage devices;  
         wherein the said external storage virtualization controller will automatically take  
         over the functionality originally performed by the alternate external storage  
         virtualization controller in the said redundant storage virtualization controller pair  
         when said alternate external storage virtualization controller is not on line or goes  
10       off line after being on line; and  
         ~~The storage virtualization controller of one of claims 78 and 81 wherein said~~  
         ~~functionality includes presenting and making available to the host entity~~  
         ~~accessible resources that were originally presented and made available by said~~  
         ~~alternate storage virtualization controller as well as accessible resources that were~~  
15       ~~presented and made available by said storage virtualization controller itself.~~

86. (currently amended) An external storage virtualization controller for use in a  
         redundant storage virtualization controller pair, comprising:  
         a central processing circuitry for performing IO operations in response to IO  
20       requests of a host entity;  
         at least one IO device interconnect controller coupled to said central processing  
         circuitry;  
         at least one host-side IO device interconnect port provided in a said at least one IO  
         device interconnect controller for coupling to said host entity; and  
25       at least one device-side IO device interconnect port provided in a said at least one  
         IO device interconnect controller for performing point-to-point serial signal  
         transmission with at least one physical storage devices;  
         wherein the said external storage virtualization controller will automatically take

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over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and

5     ~~The storage virtualization controller of any one claims 78 and 81,~~ wherein an access ownership arbitration mechanism is provided to determine which SVC in said SVC pair possesses access ownership.

10     87. (currently amended) The storage virtualization controller of one of claims claim 86 and 156, wherein said access ownership arbitration mechanism includes an access ownership detecting mechanism to determine if access ownership is possessed by said SVC.

15     88. (currently amended) The storage virtualization controller of one of claims claim 86 and 156, wherein said access ownership arbitration mechanism includes an access ownership granting mechanism to grant access ownership when said access ownership is requested by a said SVC.

20     89. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing circuitry;  
25     at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal

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transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
5 when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ further comprising  
a cooperating mechanism for the redundant SVC pair to cooperatively control a  
patching state of an access control switch together with the alternate SVC; a  
10 monitoring mechanism for said SVC of said SVC pair to monitor status of the  
alternate SVC of said SVC pair; and, a state control mechanism for said SVC to  
forcibly take complete control of said access control switch independent of the  
state the alternate SVC of said SVC pair.

15 90. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
20 circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
25 transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair

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when said alternate external storage virtualization controller is not on line or goes off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein an inter-controller communication port is provided for communicating state synchronization information between the said SVC and the alternate SVC in said redundant SVC pair.

91. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is an existing IO device interconnect port, whereby inter-controller communication exchange is multiplexed with IO requests and associated data.

92. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is a dedicated port the primary function thereof is to exchange said state synchronization information.

93. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is Fibre Channel.

94. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is Serial ATA.

95. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is Parallel SCSI.

96. (currently amended) The storage virtualization controller of one of claims ~~claim~~ 90 and 158, wherein said inter-controller communication port is Ethernet.

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97. (currently amended) The storage virtualization controller of one of claims ~~claim~~  
90 and 158, wherein said inter-controller communication port is Serial-Attached  
SCSI (SAS).

5

98. (currently amended) The storage virtualization controller of one of claims ~~claim~~  
90 and 158, wherein said inter-controller communication port is I2C.

10

99. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;

at least one IO device interconnect controller coupled to said central processing  
circuitry;

15 at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
transmission with at least one physical storage devices;

20 wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

25 ~~The storage virtualization controller of one of claims 78 and 81,~~ wherein said SVC  
can perform IO request rerouting function.

100. (currently amended) An external storage virtualization controller for use in a

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redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
5 circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
10 transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
15 off line after being on line; and  
~~The storage virtualization controller of one of claims 78 and 81, wherein said SVC~~  
~~can perform PSD access ownership transfer function.~~

101. (currently amended) An external storage virtualization controller for use in a  
20 redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
circuitry;  
25 at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal

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transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein said SVC  
includes an expansion port for coupling to a second set of at least one PSD  
through multiple-device device-side IO device interconnects.

10

102. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;

15

at least one IO device interconnect controller coupled to said central processing  
circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO  
device interconnect controller for coupling to said host entity; and

20

at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

25

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one  
said host-side IO device interconnect port is Fibre Channel supporting



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point-to-point connectivity in target mode.

103. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
5 a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
circuitry;  
at least one host-side IO device interconnect port provided in a said at least one IO  
10 device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one  
IO device interconnect controller for performing point-to-point serial signal  
transmission with at least one physical storage devices;  
wherein the said external storage virtualization controller will automatically take  
15 over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and  
~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one  
20 said host-side IO device interconnect port is Fibre Channel supporting public  
loop connectivity in target mode.

104. (currently amended) An external storage virtualization controller for use in a  
redundant storage virtualization controller pair, comprising:  
25 a central processing circuitry for performing IO operations in response to IO  
requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing  
circuitry;

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- at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;  
5 wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and  
10 ~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one said host-side IO device interconnect port is Fibre Channel supporting private loop connectivity in target mode.
- 15 105. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing circuitry;  
20 at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;  
25 wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair

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when said alternate external storage virtualization controller is not on line or goes off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one said host-side IO device interconnect port is parallel SCSI operating in target mode.

5

106. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

10

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

15

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and

20

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one said host-side IO device interconnect port is ethernet supporting the iSCSI protocol operating in target mode.

25

107. (currently amended) An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

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- a central processing circuitry for performing IO operations in response to IO requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing circuitry;  
5 at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;  
10 wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the alternate external storage virtualization controller in the said redundant storage virtualization controller pair when said alternate external storage virtualization controller is not on line or goes off line after being on line; and  
15 ~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one said host-side IO device interconnect port is Serial-Attached SCSI (SAS) operating in target mode.
108. (currently amended) An external storage virtualization controller for use in a  
20 redundant storage virtualization controller pair, comprising:  
a central processing circuitry for performing IO operations in response to IO requests of a host entity;  
at least one IO device interconnect controller coupled to said central processing circuitry;  
25 at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and  
at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal

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transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take  
over the functionality originally performed by the alternate external storage  
virtualization controller in the said redundant storage virtualization controller pair  
when said alternate external storage virtualization controller is not on line or goes  
off line after being on line; and

~~The storage virtualization controller of one of claims 78 and 81,~~ wherein at least one  
said host-side IO device interconnect port is Serial ATA operating in target mode.

10 109 – 139. (cancelled)

140. (new) The redundant storage virtualization subsystem of claim 11 wherein  
the said point-to-point serial signal interconnect is a Serial ATA IO device  
interconnect.

15 141. (new) The redundant storage virtualization subsystem of claim 12 wherein  
the said point-to-point serial signal interconnect is a Serial ATA IO device  
interconnect.

20 142. (new) The redundant storage virtualization subsystem of claim 19 wherein  
the said point-to-point serial signal interconnect is a Serial ATA IO device  
interconnect.

25 143. (new) The redundant storage virtualization subsystem of claim 20 wherein  
the said point-to-point serial signal interconnect is a Serial ATA IO device  
interconnect.

144. (new) The redundant storage virtualization subsystem of claim 36 wherein

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the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

5 145. (new) The redundant storage virtualization subsystem of claim 45 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

10 146. (new) The redundant storage virtualization subsystem of claim 46 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

15 147. (new) The redundant storage virtualization subsystem of claim 47 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

148. (new) The redundant storage virtualization subsystem of claim 74 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

20 149. (new) The redundant storage virtualization subsystem of claim 75 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

25 150. (new) The redundant storage virtualization subsystem of claim 76 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

151. (new) The redundant storage virtualization subsystem of claim 77 wherein

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the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

5 152. (new) The storage virtualization controller of claim 82 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

10 153. (new) The storage virtualization controller of claim 83 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

15 154. (new) The storage virtualization controller of claim 84 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

20 155. (new) The storage virtualization controller of claim 85 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

25 156. (new) The storage virtualization controller of claim 86 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

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157. (new) The storage virtualization controller of claim 89 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

5

158. (new) The storage virtualization controller of claim 90 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

10

159. (new) The storage virtualization controller of claim 99 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

15

160. (new) The storage virtualization controller of claim 100 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

20

161. (new) The storage virtualization controller of claim 101 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

25

162. (new) The storage virtualization controller of claim 102 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial



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ATA IO device interconnect.

5 163. (new) The storage virtualization controller of claim 103 wherein the a said  
at least one device-side IO device interconnect port comprises a Serial ATA  
interconnect port for connecting to a said physical storage device through a Serial  
ATA IO device interconnect.

10 164. (new) The storage virtualization controller of claim 104 wherein the a said  
at least one device-side IO device interconnect port comprises a Serial ATA  
interconnect port for connecting to a said physical storage device through a Serial  
ATA IO device interconnect.

15 165. (new) The storage virtualization controller of claim 105 wherein the a said  
at least one device-side IO device interconnect port comprises a Serial ATA  
interconnect port for connecting to a said physical storage device through a Serial  
ATA IO device interconnect.

20 166. (new) The storage virtualization controller of claim 106 wherein the a said  
at least one device-side IO device interconnect port comprises a Serial ATA  
interconnect port for connecting to a said physical storage device through a Serial  
ATA IO device interconnect.

25 167. (new) The storage virtualization controller of claim 107 wherein the a said  
at least one device-side IO device interconnect port comprises a Serial ATA  
interconnect port for connecting to a said physical storage device through a Serial  
ATA IO device interconnect.

168. (new) The storage virtualization controller of claim 108 wherein the a said

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at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.